



British
Geological Survey

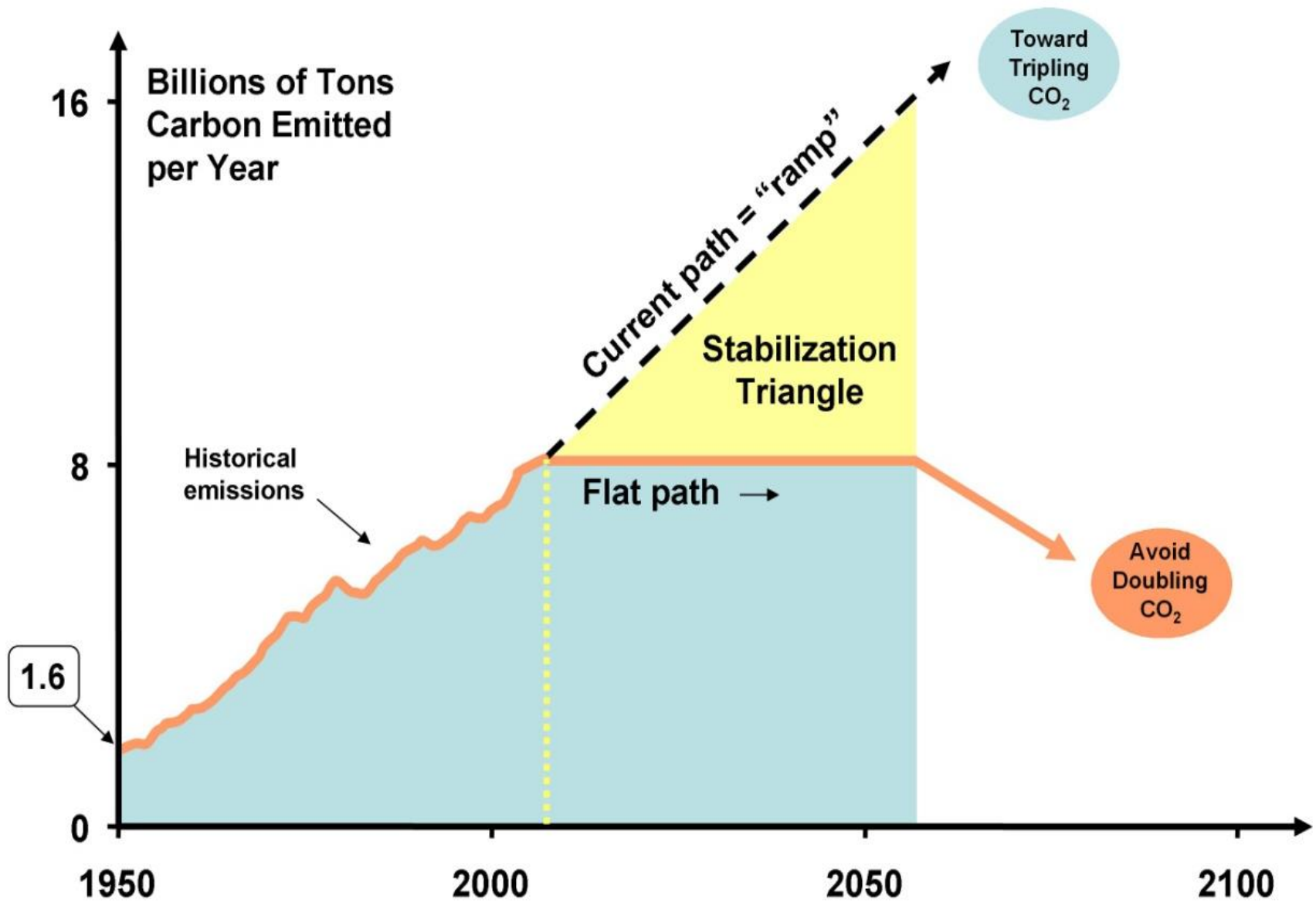
NATURAL ENVIRONMENT RESEARCH COUNCIL

Gateway to the Earth

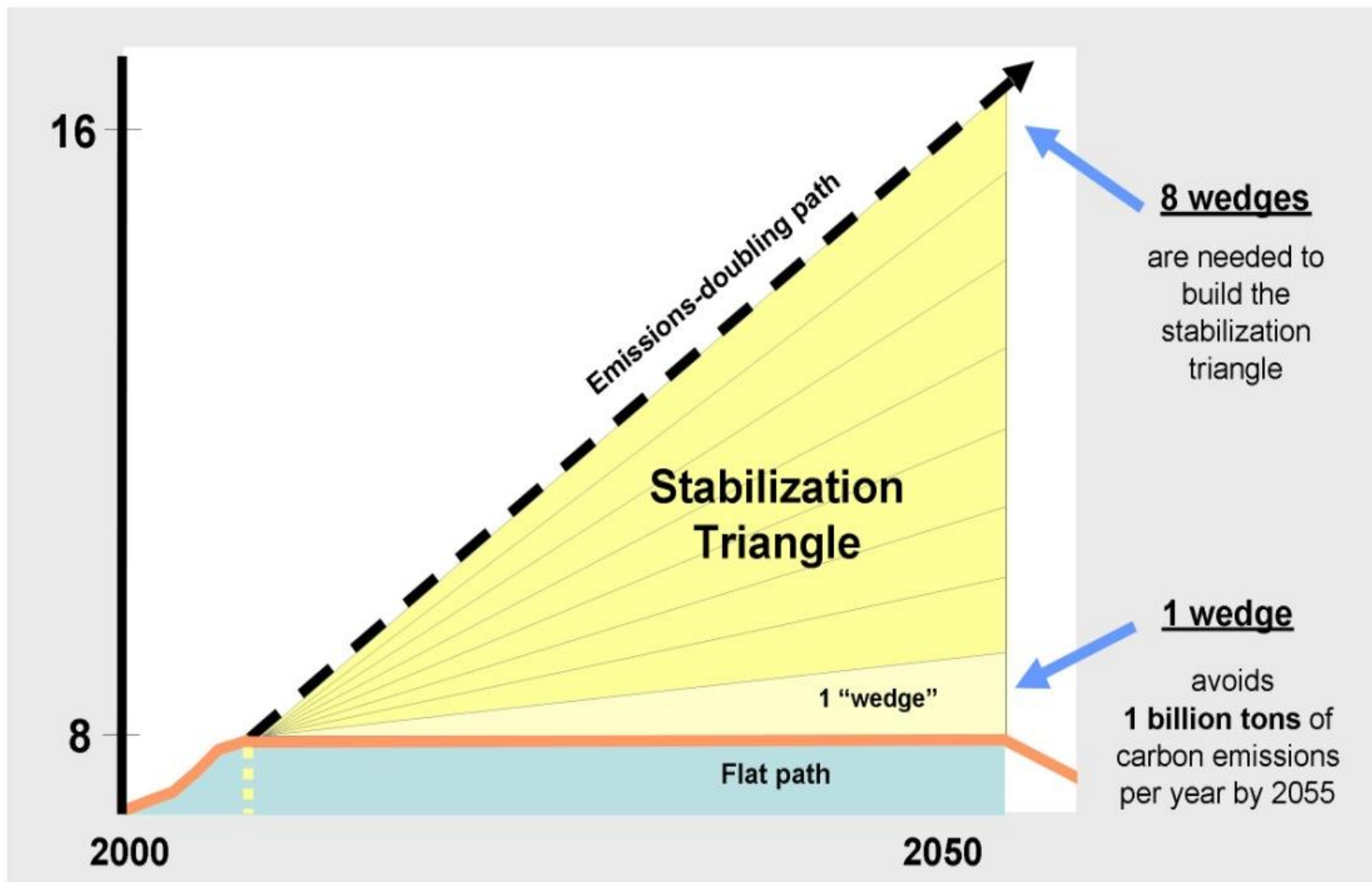
Lighting up the underworld

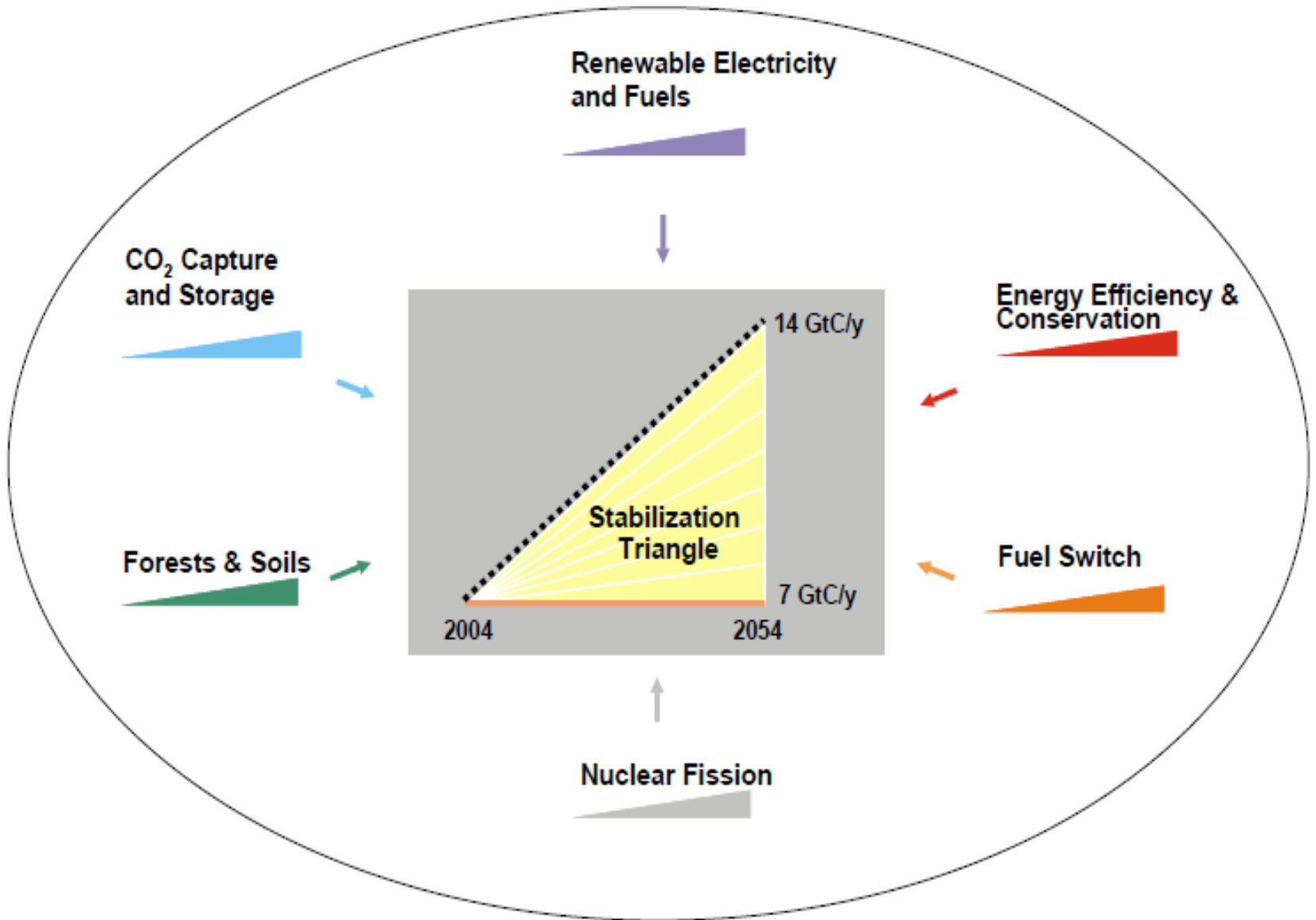
John Ludden

Presentation for the Deep Carbon Observatory DCO & GIFT workshop
April 2015



Pacala S., Socolow R. 2004. Stabilization wedges: solving the climate problem for the next 50 years with current technologies. *Science* 305, 968-972.





Several of these wedges are in the geoscience remit
So we should invest in research

We have a problem

Four of our lower carbon solutions are 'geological' but the public needs to develop confidence in our ability to solve them...

MORE IN THIS SECTION

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Lobbyists stopped ambitious EU energy targets

Junker: I will always respond to unfair criticism from national EU leaders

EU auditors push for more oversight and smarter spending

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New Council voting means Germany is Europe's reluctant paymaster

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EU leaders adopt 'flexible' energy and climate targets for 2030

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Published: 24/10/2014 - 09:42 | Updated: 25/10/2014 - 14:50



Angela Merkel (Left) and François Hollande at the EU summit, 23 Oct. 2014 [European Council/Flickr]

EU leaders Thursday night (23 October) committed by 2030 to reduce greenhouse gas emissions by at least 40%, and increase energy efficiency and renewables by at least 27%.

French President François Hollande said the deal would send a clear message to big polluters such as China and the United States ahead of UN talks in Paris next year to agree global legally binding greenhouse gas emissions.

A special 'flexibility clause' was added to the final text, making it possible

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With the support of United Technologies

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BACKGROUND

For 2030, the EU climate and energy framework has proposed:

- A 40% greenhouse gas reduction target that is binding at nation state level and may not be met by carbon offsets
- The use of carbon offsets to meet further emissions reduction commitments made in international climate talks
- A 27% renewable energy target that is binding at an aggregate European level but voluntary for individual member states
- No consideration of any new energy efficiency target until after a June 2014 review of the Energy Efficiency Directive
- Non-binding shale gas recommendations which could be made binding after a review in 2015
- A market reserve facility for the Emissions Trading System, with the power to withhold or release up to 100 million allowances

There are a number of exploration and development projects for metallic minerals currently in the UK

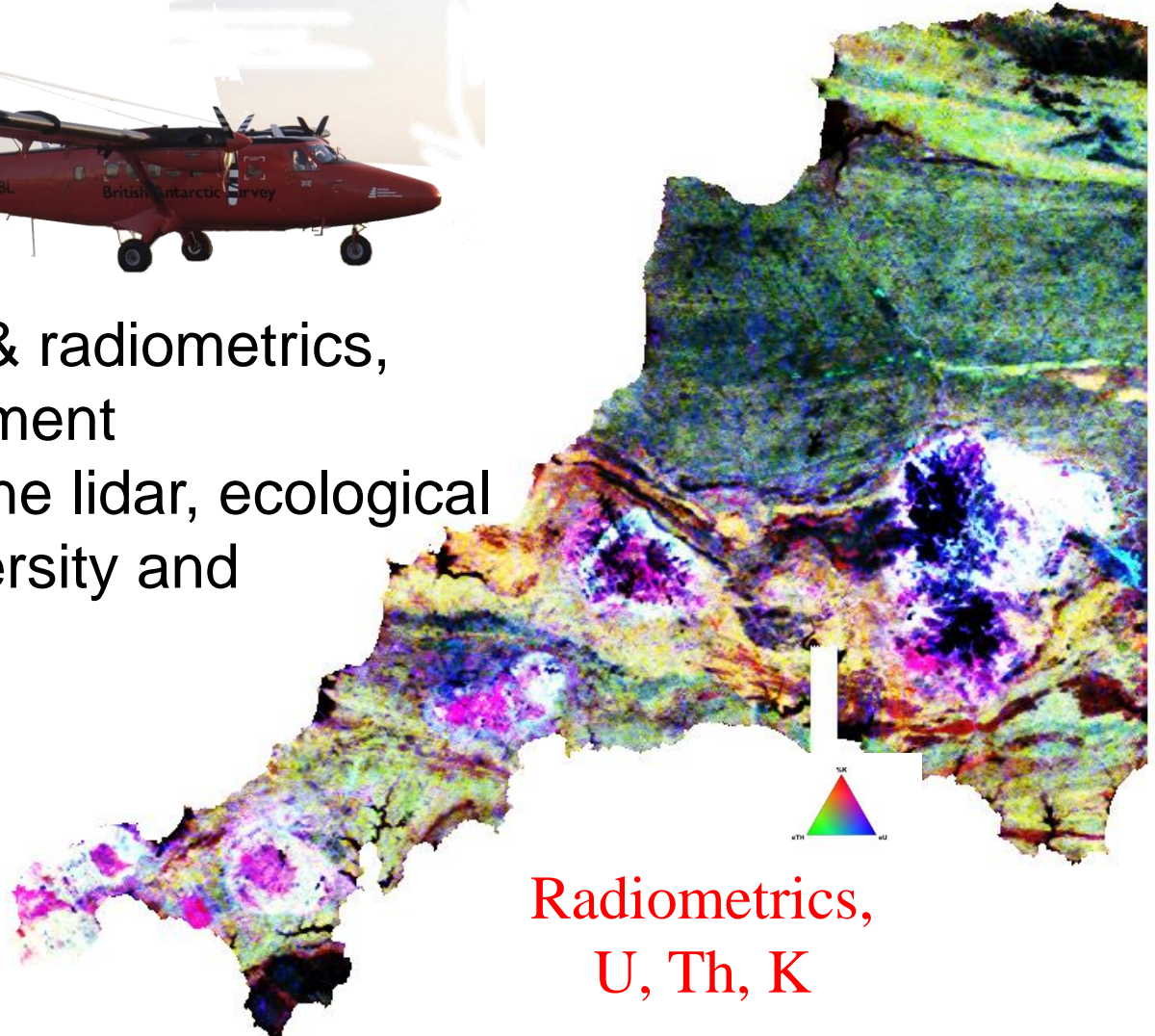
Name	Company	Commodities	Location	Status
Omagh mine (formerly Cavanacaw)	Galantas Gold Corporation	Au, Ag, Pb	Omagh, N Ireland	Operating mine
Curraghinalt	C3 Resources Inc	Au, Ag	Omagh, N Ireland	Active exploration
Cononish	Scotgold Resources Ltd	Au, Ag	Tyndrum, Highland	Active development
Parys Mountain	Anglesey Mining plc	Zn, Cu ,Pb, Ag, Au	Anglesey, N Wales	Care and maintenance
Arthrath	Alba Mineral Resources plc	Cu, Ni, PGE	Ellon, Aberdeenshire	Active exploration
South Crofty	Western United Mines Ltd	Sn	Cornwall	Active development
Hemerdon	Wolf Minerals Ltd	W, Sn	Devon	Active development

Tellus South West

Health check' of the current state of the environment
geology, soils, landscape and ecology



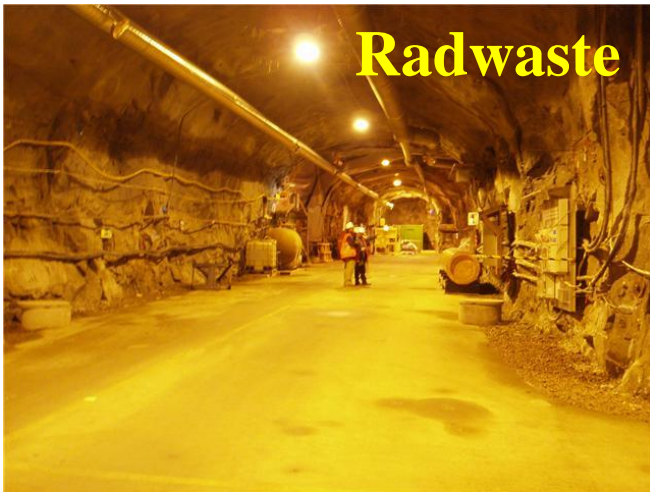
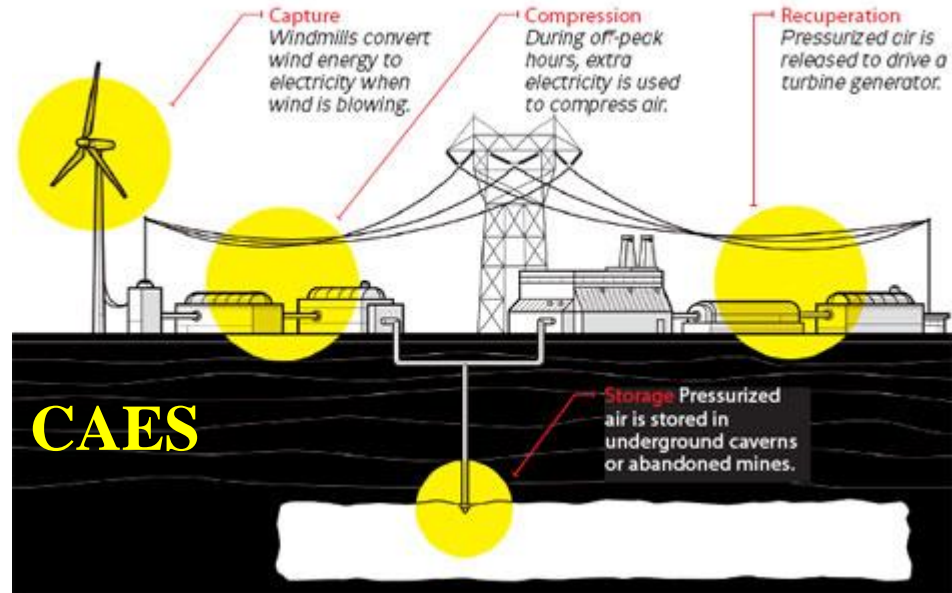
Airborne magnetics & radiometrics,
soil and stream sediment
geochemistry, airborne lidar, ecological
status, microbial diversity and
genomics



Radiometrics,
U, Th, K



Low(er) C solutions



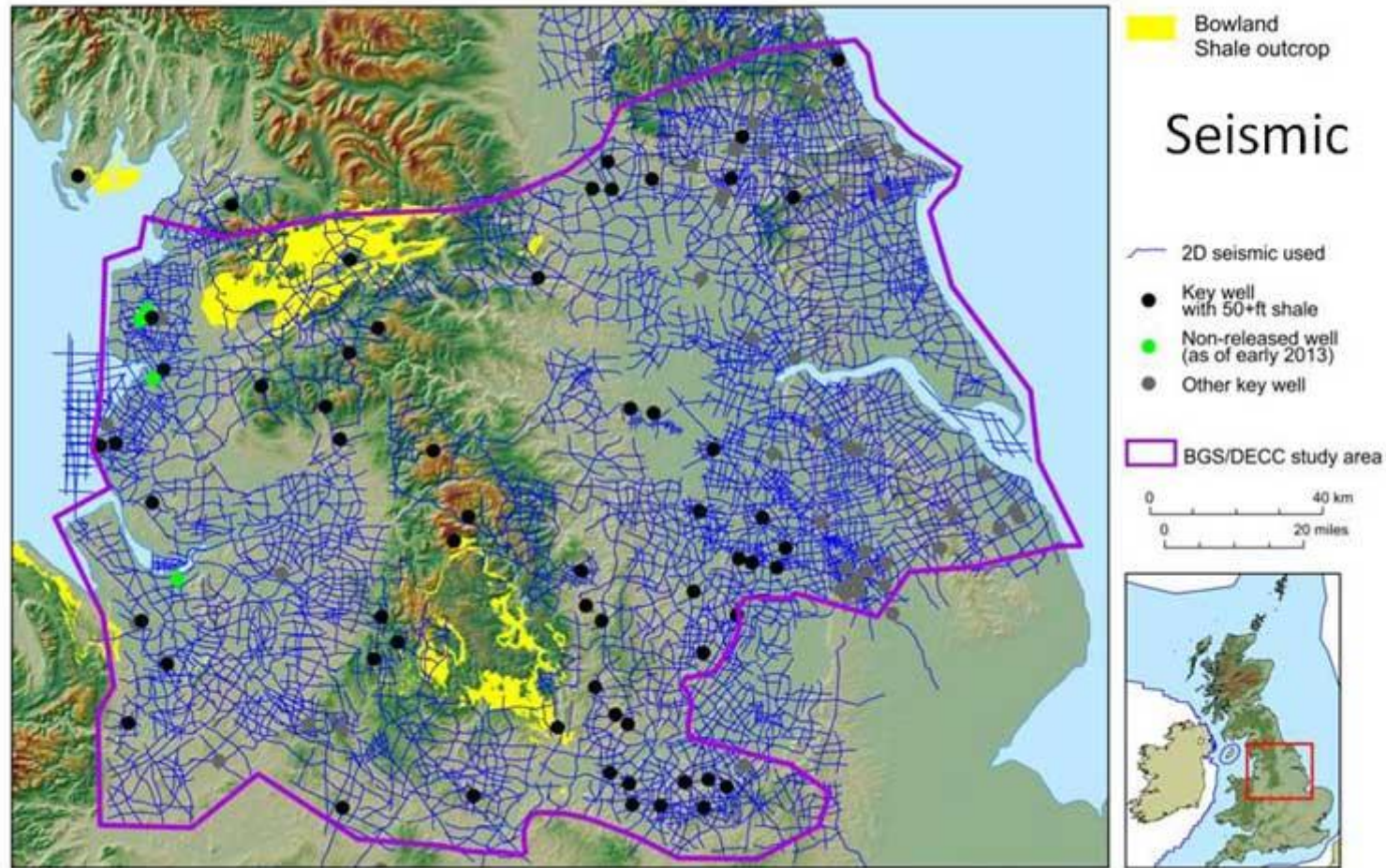
Shale gas



Even though we are researchers, we are seen by some as part of the problem



Shale gas resource



Median value
1300 Tcf

Company resource estimates



centrica

200Tcf



15-170Tcf



70-150Tcf (reported)
(Eire/N Ireland)



110Tcf



GDF SUEZ

BY PEOPLE FOR PEOPLE

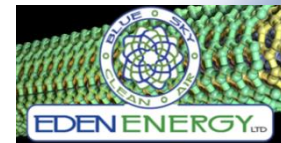
Celtique Energie
Exploring responsibly for oil and gas in Europe

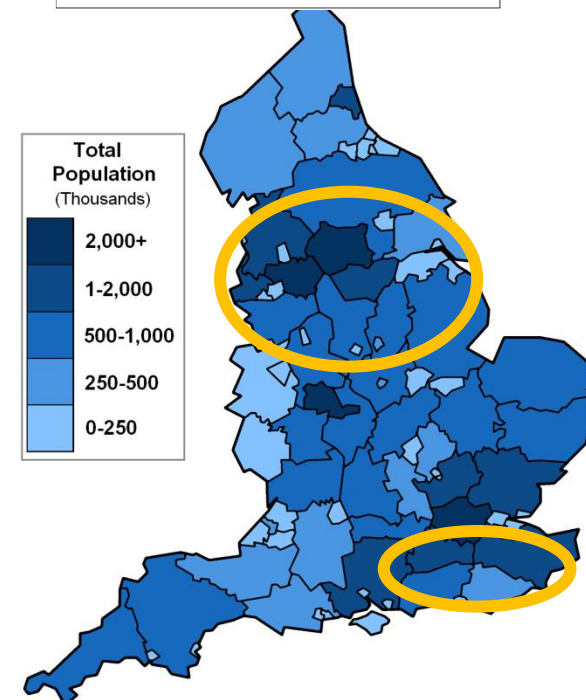
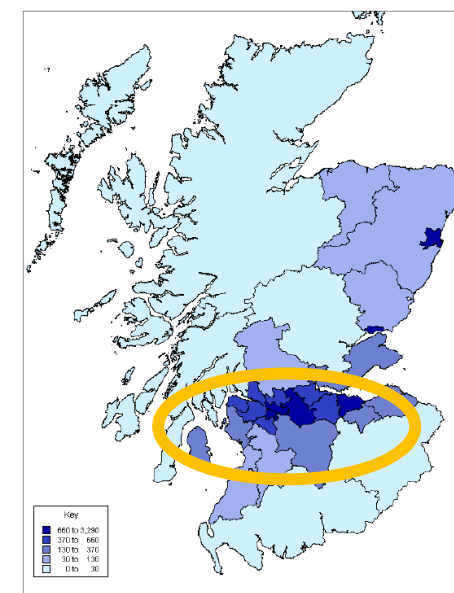
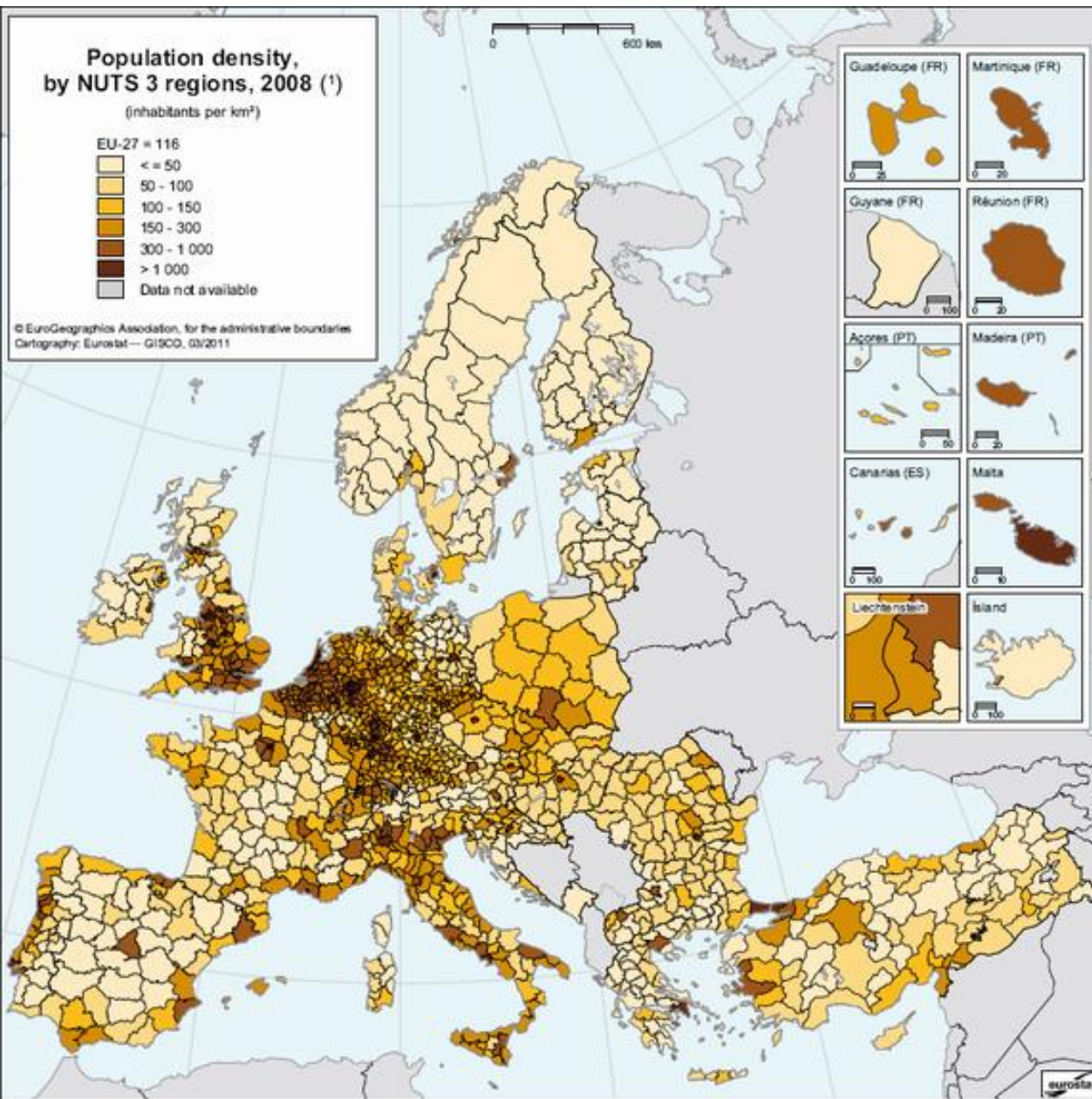


1.76Tcf



34Tcf





(*) Population density is calculated as ratio between (annual average) population and surface (land) area. Land area is a country's total area, excluding area under inland water. Bulgaria, Denmark, Germany, France, Cyprus, Poland and Portugal, total area has been used instead of land area; Poland, by NUTS 2 regions, United Kingdom, 2007.

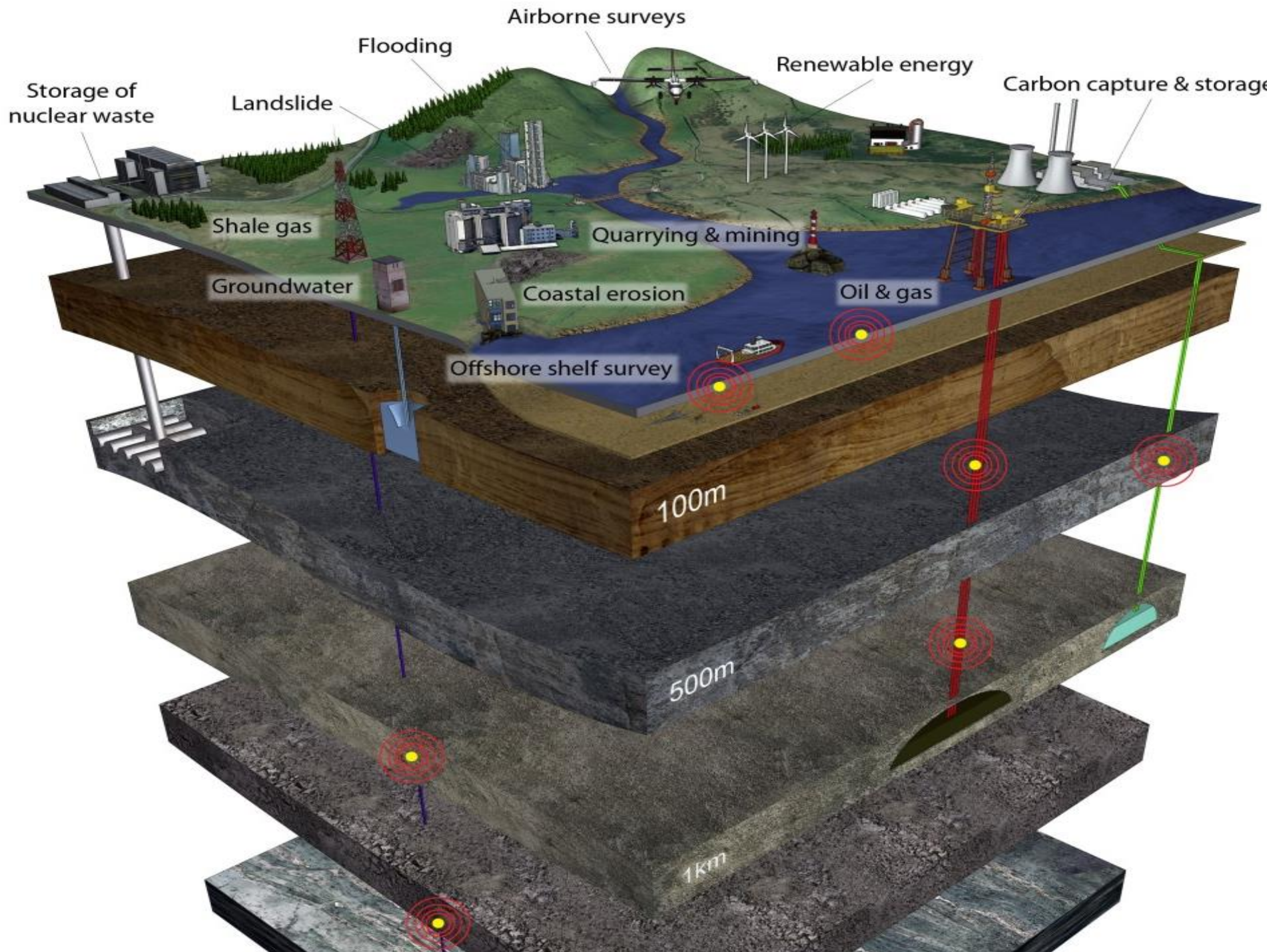
We need the public to be confident about our ability to manage the subsurface and to feel they can find out information when they need it



Introducing The Energy Test Bed

A unique package of monitoring and research capability at the surface and in the **critical zone** coupled with **deep borehole** monitoring of variables such as pressure, temperature, heat flow, seismicity, tilting, strain accumulation, fluid, rock and mineral chemistry, pH and biological properties.

Initial investment by UK Government through NERC-UK £31 million for two research sites with expected leverage



An opportunity to reconnect applied earth science research with discovery science.

Act as a catalyst for industry both onshore and offshore to stimulate investment and speed new technology options to commercialisation.

Open industry data to the public and develop a transparent energy industry.

An opportunity to export this technology globally

An opportunity to collaborate scientific globally in sensor technology and scientific application

Is this an enabler for industry or a safeguard against potential adverse environmental impacts?

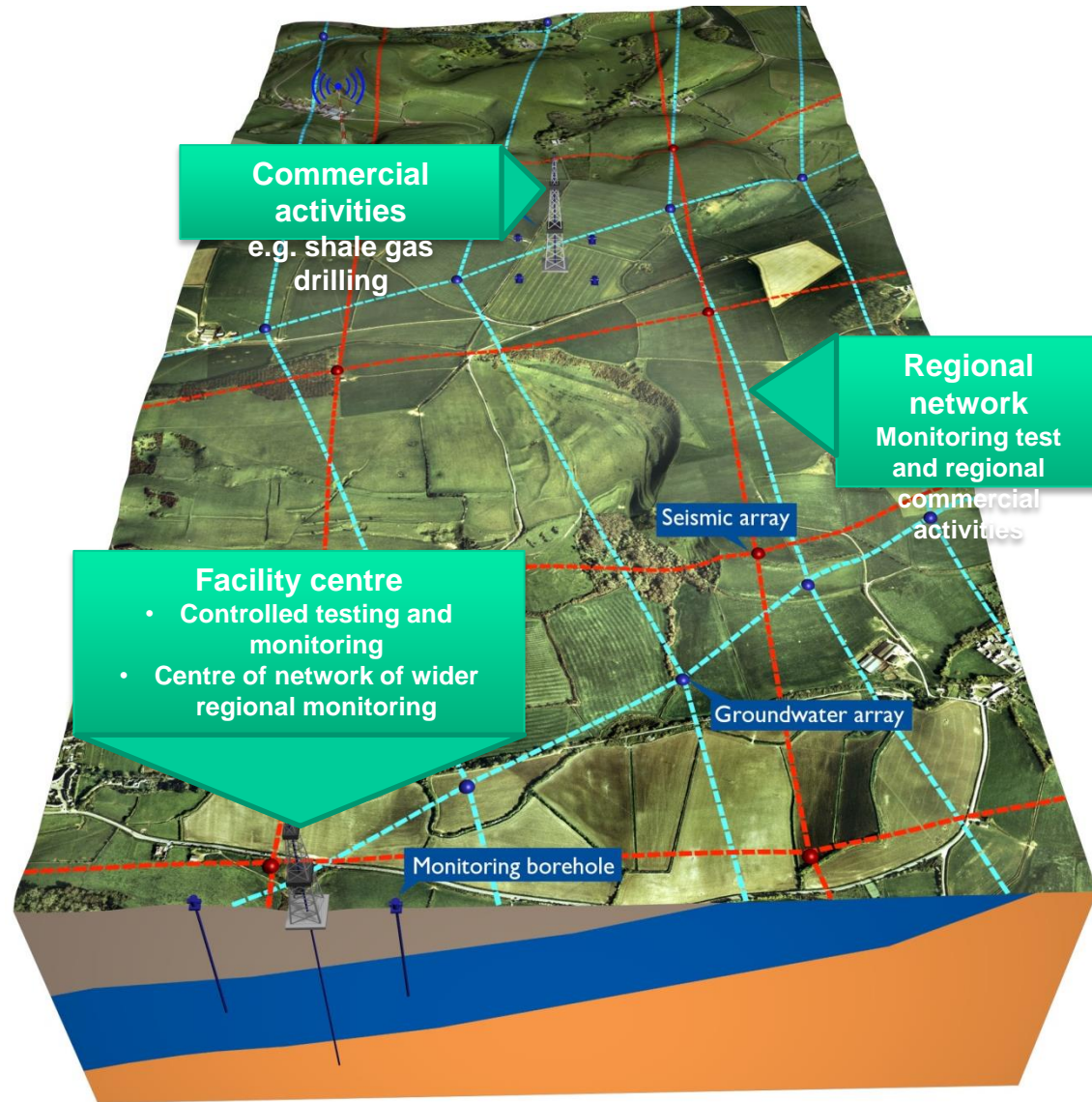
So we have to articulate very carefully why we are spending public money on this research

- key messages are agreed and made clear throughout and critical to supporting project operations, managing stakeholder engagement and mitigating reputational damage.
- activities and outcomes of the research will be communicated, both internally and externally, in an open and transparent manner.
- staff involved in the research provided with the tools and capability to enable them to communicate the research to all stakeholders.

The first site

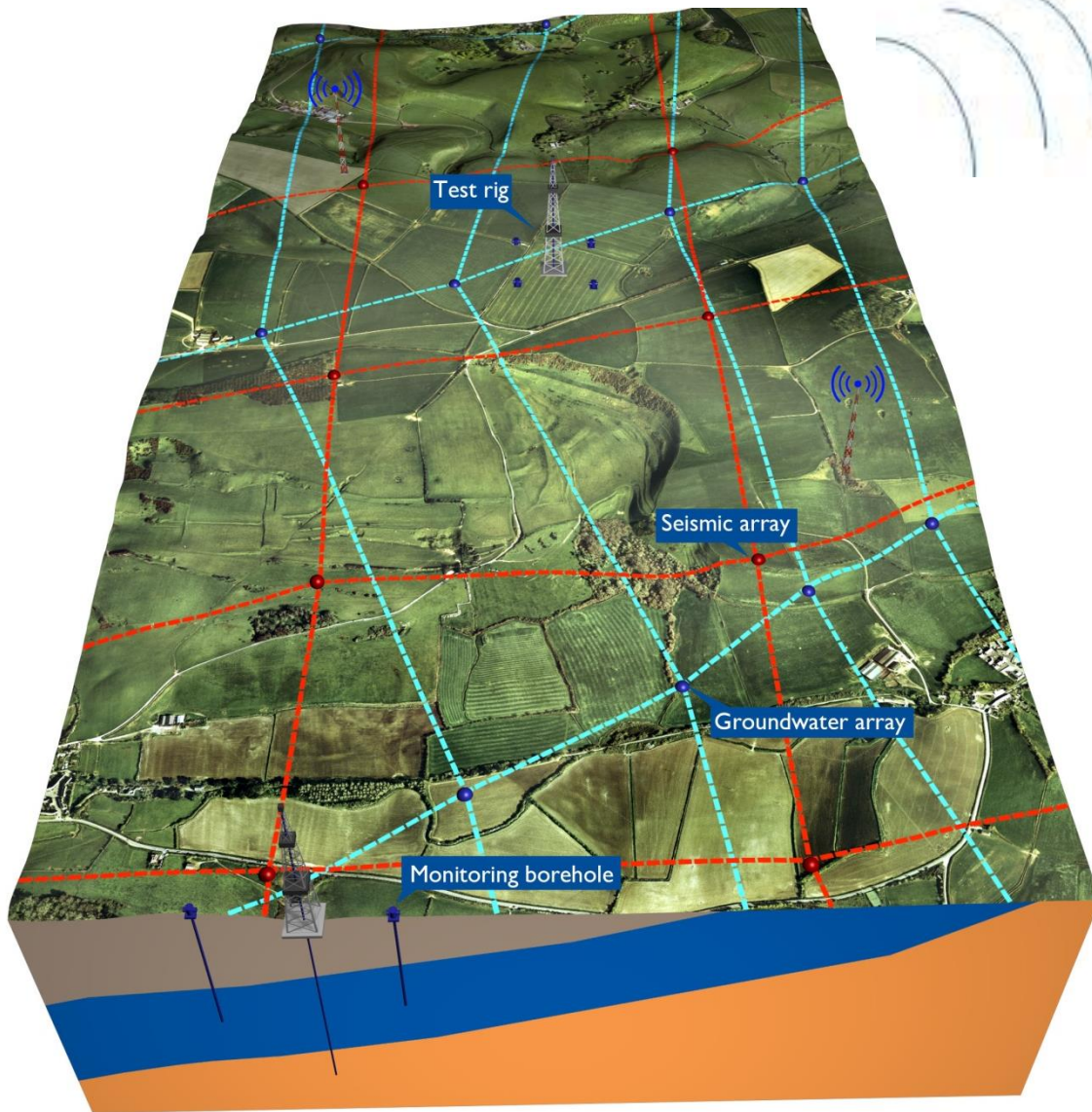


First site: Thornton



Combined testing/experiment and monitoring

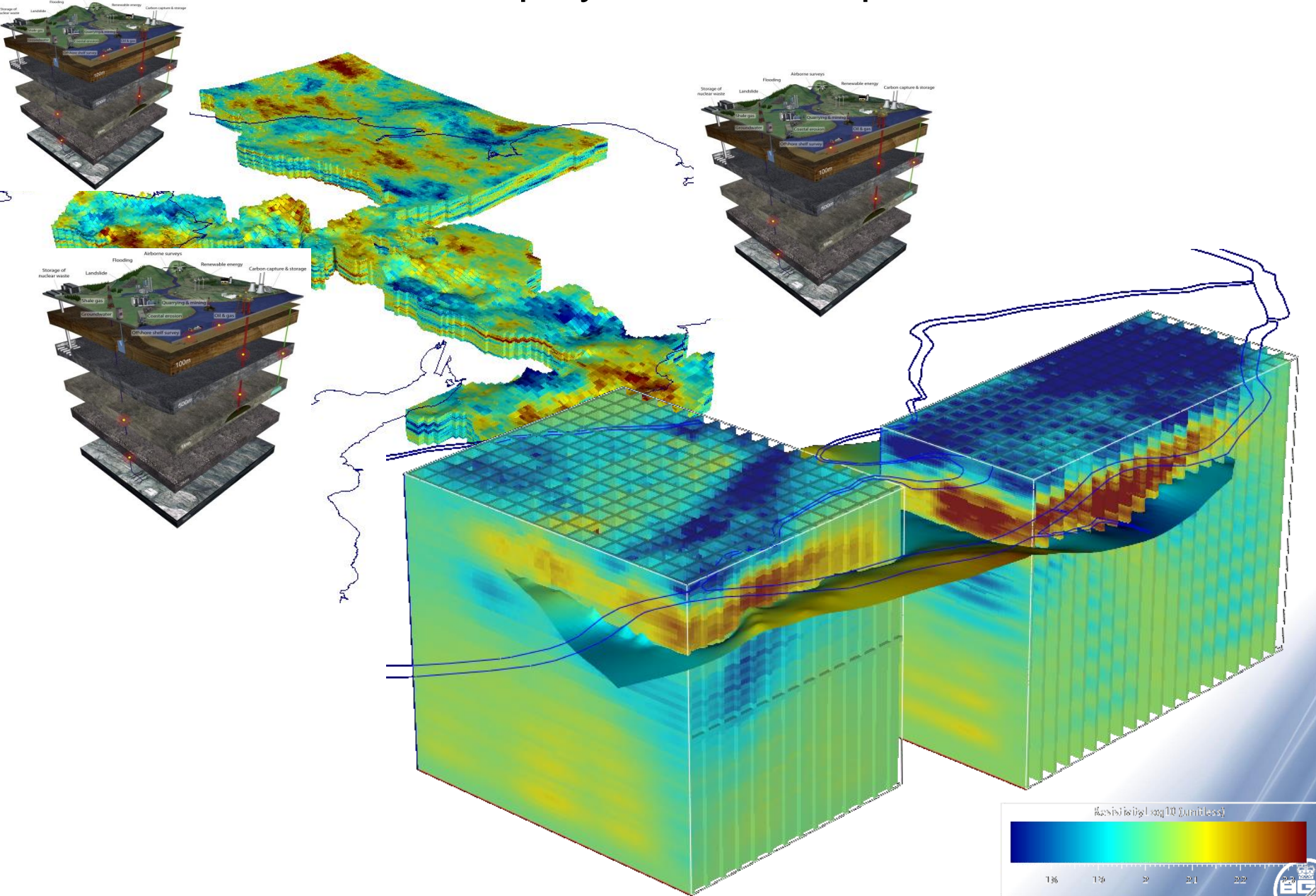
Communication



Full, open disclosure of all data, often in real time



Multi-site deployment at multiple scales

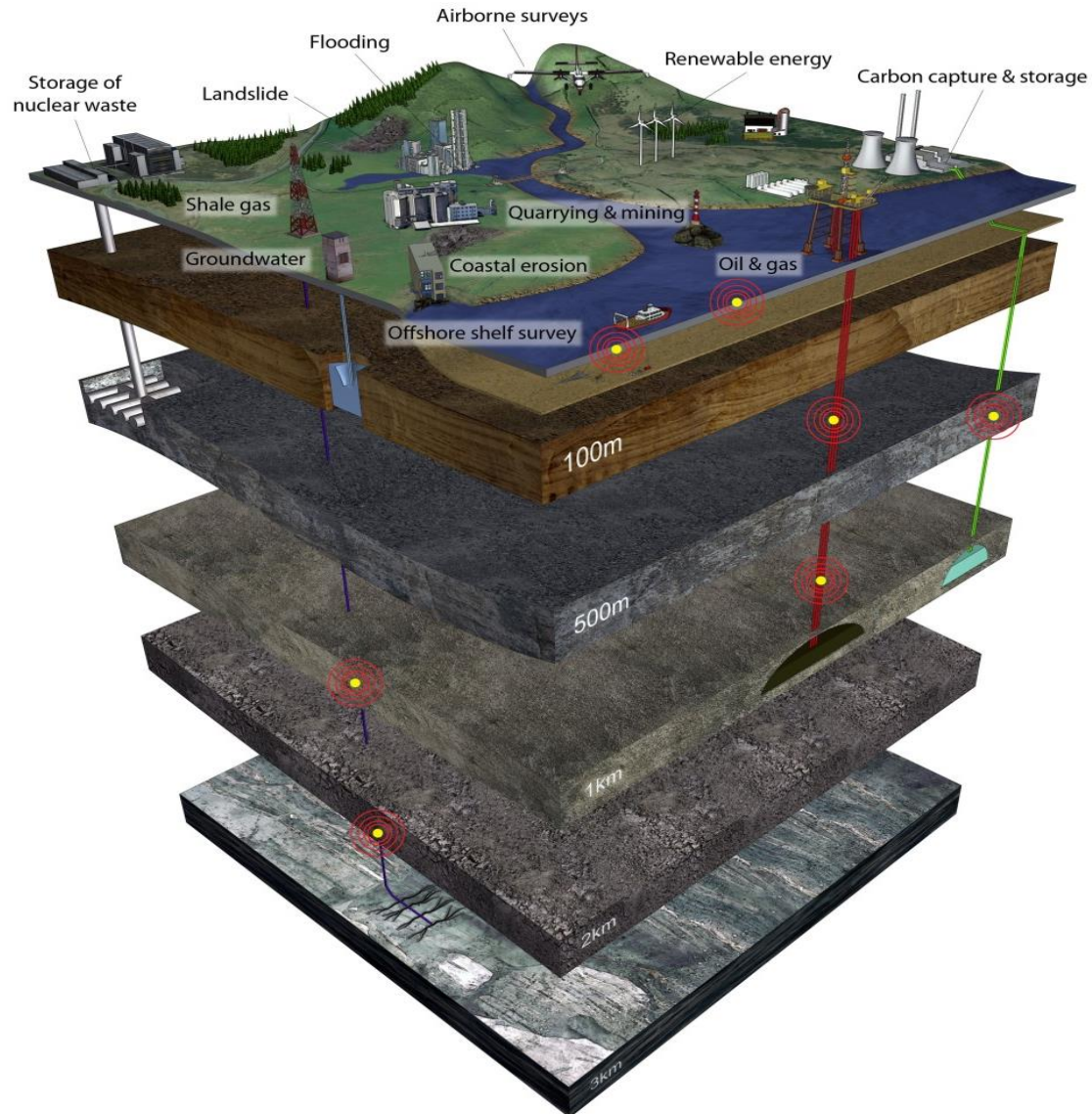


Conclusions

In GeoEnergy we work in a controversial space

- We have to articulate the reason for our science
- We have to ensure that the science is given a fair hearing by remaining even-handed

The Energy Test Bed is funding for a 'national facility' and an opportunity to join applied and fundamental science questions



The Energy Test Bed